

UNDERPINNING STRUCTURAL NOTES

Division 1 - General Requirements:

1. All construction shall be in compliance with the provisions of the 2006 IBC & IRC building codes with DC amendments (DCMR12B-2008 & DCMR12J-2008).
2. Work performed shall comply with these general notes unless otherwise noted on plans.
3. Work performed shall comply with all applicable local and state codes, ordinance and regulations.
4. On-site verification of all dimensions and conditions shall be the responsibility of the general contractor and his subcontractors.
5. Discrepancies: The contractor shall compare and coordinate all drawings; when in the opinion of the contractor, a discrepancy exists he shall promptly report it to the Designer for proper adjustment before proceeding with the work.
6. Omissions: In the event certain features of the construction are not fully shown on the drawings, their construction shall be of the same character as for similar conditions that are shown or noted.
7. All work is to be performed in a professional manner and in accordance with standard practice and shall be in strict compliance with manufacturer's specifications and/or recommendations.
8. Dimensions shall be read or calculated and never scaled. All dimensions are to the rough unless noted otherwise.
9. The General and Sub-Contractors shall carefully examine the drawings inspect the site and acquaint themselves with all governing ordinances, laws, etc. and otherwise familiarize themselves with all matters which may affect performance of the work.
10. The structural integrity of the building is dependent upon completion according to the plans and specifications. The structural engineer of record assumes no liability for the structure during construction. The method of construction and sequence of operations is the sole responsibility of the contractor. The contractor shall supply any necessary bracing, guys, etc. to properly brace the structure against wind, dead and live loads until the building is completed according to the plans specifications. Any questions regarding temporary bracing requirements should be forwarded to a structural engineer for review.

Division 2 - Concrete Notes:

1. All concrete shall be 3500 PSI at 28 days.
2. Reinforcing steel shall conform to ASTM A 615 deformed grade 60.
3. Reinforcement in footings shall be 3" clear from the bottom of footings & from the sides.
4. No concrete shall be placed until all reinforcement has been placed and inspected by the building official.
5. The soil bearing capacity shall conform to or exceed 1500psf.

Division 3 - General Underpinning Notes:

1. This drawing shows the underpinning required to allow construction of the additions & renovations. Only information necessary to accomplish this work is shown.
2. We do not control job site assembly or procedures, grade or quality of materials or equipment provided by others it is the responsibility of the contractor to integrate this drawing into a composite drawing suitably complete for construction purposes consistent with safe practice and overall project objectives.
3. We shall not be responsible in the event of any deviations, changes, or alternations to the recommended assembly details described in this drawing unless such deviations, changes or alterations are illustrated in a revised drawing.
4. Contractor shall be responsible for all bracing, shoring & support of existing structure for the construction of underpinning.
5. Contractor shall verify all sizes & locations of existing wall footing before any underpinning work begins.
6. Excavation under existing footing shall be done alternately in 4'-0' sections max. 1,4,2,5,3,1,4,2,5,3,1.... etc. per Pit Sequence Detail (3/S1.1) With appropriate support of structure & excavation, allow 48 hr for concrete curing prior to dry packing of existing work.
7. Contractor shall, clean existing surfaces of all loose materials & prepare existing masonry units, foundation & foundation subgrade to accept underpinning.
8. Contractor shall backfill all excavated voids under adjacent concrete slabs & footing caused by underpinning with concrete.
9. Contractor shall pour concrete & shall excavate another adjacent section when the previous pours are cured & able to support existing wall. The time period shall be minimum 7 days.
10. Contractor shall project all existing work from damage during construction.
11. Minimum width of underpinning shall be same as that if existing footing which shall be field established
1. 12a: Underpinning work shall be performed by a specialty contractor having a minimum of 5 years of experience under similar situations and regularly engaged in this type of work.
2. 12b: Contractor shall review the construction documents for any conflicts with the existing field conditions, resolve such conflicts and coordinate compatibility of new work with existing conditions before proceeding with the underpinning work.
3. Protect all existing structural and architectural building elements and utilities /services from damage during underpinning work.
4. 12c: Follow strictly the sequence of underpinning in the direction specified on the plan for each sequence group. Do not move to the next sequence group until all segments in the sequence undertaken are underpinned.
5. 12d: Mark underpinning segments on the walls and number them as shown on the plan. Complete underpinning of all segments marked 1's first, 2's second, 3's third, 4's fourth and 5's last.
6. 12e: Limit to a maximum of three (3) open pits in each group in any wall at any time. Do not open pits in the other group until all segments in the group undertaken have been completed, cured and able to support the existing wall and the loads carried by it.
7. 12f: Shore/brace/support temporarily all framing/structure resting on the existing wall footing segment to be underpinned. Shores shall remain in place until the underpinning of the segment has been completed (concrete in footing and wall cured and dry pack or non-shrink grout installed and cured).
8. 12g: Excavate the segment to the design depth using manual tools. Excavation for the segment being underpinned, if unstable, shall be braced/supported immediately.
9. 12h: The excavated earth shall be removed from the site. If stored on the site, it shall not obstruct the free drainage of storm water from the site.

1. 12i: Drill holes in the existing earth on each side of the start footing segment and on one side of subsequent segments are required for rebar installation. Protect part of the dowel in dirt with a plastic wrap which shall be removed prior to placing concrete in adjacent segment. Repeat the process for wall segments. Thoroughly clean surfaces of underpinning footings and walls segments already completed and to be in contact with new work (new segment, dry pack, isolation joint materials etc.) of all loose materials and dirt. Then form, place reinforcement including dowels, construction joint keys, between segments, RX water stops and dowels for adjacent segment. Place, consolidate and vibrate concrete to insure no voids. Place enough concrete to make sure that the void space on the adjoining neighbor's side is completely filled. Dry packing shall be a minimum of 2" and shall precede only 72 hours minimum after concrete pour for the segment.
2. 12k: Complete underpinning of all segments following the specified sequence and direction of underpinning. Existing floor slab and earth below shall be excavated to the required/specified elevation as the final step.

Shoring Notes:

1. Provide proper shoring posts or framing under floor joists. Ensure the distribution of leg loads to floor or ground.
2. Fasten all braces securely. Check to see that all clamps, screws, pins and all other components are in a closed or engaged position.
3. Make certain that all base plates and shore heads are in firm contact with forming material.
4. Use special precautions when shoring to or from sloped surfaces.
5. Avoid eccentric loads. Also avoid shock or impact loads for which the shoring was not designed.
6. The completed shoring setup shall have the specified bracing to give it lateral stability.
7. The erection of shoring should be under the supervision of an experienced and competent person.

Construction Materials:

Concrete: 3,500psi @ 28 days
Pit shoring: 2” nominal width mixed hardwoods

Drypack: 3 parts sand to 1 part Type I Portland Cement with just enough moisture for optimum compaction.

Underpinning - Construction Procedures:

1. Excavate to the top of the existing footing.
2. Layout underpinning pits as shown on plan and sections.
3. Excavate underpinning pits to the depths indicated on the pit sections.
4. Dig and shore pit in as per pit sequence.
5. Pour concrete, leaving a 2-inch space between the concrete and the underside of the existing footing;
6. On the following morning drypack the 2 - inch space by the ramming the drypack mixture with a 2 4 and a 2 lb sledge.
7. Continue next sequence of underpinning pits after first sequence has been poured and dry packed

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SEAL

PROJECT TITLE

UNDERPINNING
DESIGN FOR
1521 VARNUM ST NW
WASHINGTON, DC

ISSUES

NO.	DATE	DESCRIPTION

REVISIONS

NO.	DATE	DESCRIPTION

PROJECT NO:

2014-180

CAD DWG FILE:

2014-180 1521 VARNUM STREET NW STRUCTURAL SET.DWG

DRAWN BY:

BWB

CHKD BY:

SCALE:

SEE DRAWING

DATE:

01-03-12

SHEET TITLE

UNDERPINNING NOTES

SHEET NUMBER

U-001

SHEET

1

OF

2

2nd of Zoning Adjustment

DISTRICT OF COLUMBIA

CASE NO. 18991

EXHIBIT NO.43B

File Location: Y:\Projects 2014\2014-180 1521 Varnum St\NWStruct\2014-180 1521 Varnum Street NW Structural Set.dwg Last Saved: 7/30/2014 7:22:02 AM, by Ahmed Plotted: Wednesday, July 30, 2014 7:26:07 AM by Ahmed

STRUCTURAL NOTES

DIVISION 1 - GENERAL REQUIRMENTS

- All construction shall be in compliance with the provisions of the 2006 IBC building codes with DC amendments (DCMR12J-2008).
- Work performed shall comply with these general notes unless otherwise noted on plans.
 - Work performed shall comply with all applicable local and state codes, ordinance and regulations.
 - On-site verification of all dimensions and conditions shall be the responsibility of the general contractor and his subcontractors.
 - Discrepancies: The contractor shall compare and coordinate all drawings; when, in the opinion of the contractor, a discrepancy exists he shall promptly report it to the Designer for proper adjustment before proceeding with the work.
 - Omissions: In the event certain features of the construction are not fully shown on the drawings, their construction shall be of the same character as for similar conditions that are shown or noted.
 - All work is to be performed in a professional manner and in accordance with standard practice and shall be in strict compliance with manufacturer's specifications and/or recommendations.
 - Dimensions shall be read or calculated and never scaled. All dimensions are rough unless noted otherwise.
 - The General and Sub-Contractors shall carefully examine the drawings inspect the site and acquaint themselves with all governing ordinances, laws, etc. and otherwise familiarize themselves with all matters which may affect performance of the work.
 - Mechanical units and any other equipment supported by the structure with weights in excess of 200lbs shall be brought to the attention of the structural engineer prior to installation.
 - Shop drawing for all structural elements shown on the contract documents must be submitted by the general contractor and reviewed by the engineer. Should the owner or general contractor fail to obtain the structural engineer's review of the shop drawings, the structural engineer will not accept responsibility for the design and certification of this project. Prior to submission of the shop drawings, the contractor shall review shop drawings for compliance with the contract documents. Shop drawings shall not be issued prior to final construction set.
 - Design Loads - IBC 2006 Code, Section 1603:

Analysis Method	ASD-Design Method		
Building Occupancy:	Category II		
	Live Loads	Dead Loads	Total Loads
Roof Rafters:	30 PSF	15 PSF	45 PSF
Roof Trusses:	30 PSF	7 PSF-Top	47 PSF
		10 PSF-Bottom	
Floors:	40 PSF+15 PSF	15 PSF	70 PSF
Private Balconies:	60 PSF	10 PSF	70 PSF
Balcony:	100 PSF	15 SDL	
Stair:	100 PSF		
Public Spaces:	100 PSF		
Public Terraces:	100PSF		
Planting Soil/Ft. Depth:		120 PSF	
2” Brick Pavers + 1” Setting:		30 PSF	
Pedestrian Accessible:		100 PSF	
Snow Load:	30 PSF		
12. Roofs design for assembly purposes shall be designed for 100 PSF live load or approved by AHJ			
13. Wind Load and Design Criteria - IBC Section 1609			
V3s:	90 MPH		
Importance factor, II: 1.0			
Exposure category:	B		
GCpi:	+/-0.18		
Minimum components and cladding wind load: 20 PSF			
14. Seismic Loads and Design Criteria - IBC Section 1613			
Occupancy Category :	Category II		
IE:	1.00		
SS:	0.154		
S1:	0.050		
SDS:	0.164		
SD1:	0.081		
Site Class:	D		
Basic seismic-force resisting system: Ordinary reinforced masonry shear walls			
I:	1.0		
CS:	0.055		
R:	3.0		
Design Base Shear:	27 KIPS		
Analysis Procedure: Equivalent Lateral Force Procedure			
15. Hand Rails and Guard Rails - IBC Section 1607			
15.1. Handrails and guardrails shall be designed to resist a load of 50 PLF applied in any direction at the top and to transfer this load through the supports to the structure.			
15.2. Handrail and guardrail assemblies shall be able to resist a single concentrated load of 200 lbs applied in any direction at any point along the top, and have attachment devices and supporting structure to			

- transfer this loading to appropriate structural elements of the building (this loading need not act concurrently with the loads specified above).
- Intermediate rails, balusters, and panel fillers shall be designed to withstand a horizontally applied normal load of 50 lbs on an area equal to 1 square foot.
 - The structural integrity of the building is dependent upon completion according to the plans and specifications. The structural engineer of record assumes no liability for the structure during construction. The method of construction and sequence of operations is the sole responsibility of the contractor. The contractor shall supply any necessary bracing, guys, etc. to properly brace the structure against wind, dead and live loads until the building is completed according to the plans specifications. Any questions regarding temporary bracing requirements should be forwarded to a structural engineer for review.

DIVISION 2 - FOUNDATION NOTES

- Assumed basement foundation soil bearing values of 1500 psf (see foundation plan for locations) to be verified by geotechnical engineer or qualified soils technician. Refer geotechnical report for earthwork procedures, compaction, and additional information.
 - The Structural Engineer of Record must be notified of all areas where footing bears directly on bedrock.
- Refer to architectural drawings for dimensions and elevations not shown. G.C. to verify all dimensions and elevations. Notify the engineer of discrepancies prior to starting construction.
- Concrete slab elevation varies see plans and architectural drawings for slab high & low point elevations.
- Refer to architectural drawings for location of column and walls.
- Footing elevations may require lowering or other remedial steps if unsuitable soils are found at footing grades, removal/undercutting and replacement of unsuitable soils/fill where necessary
- Slab on grade construction: 4” thick normal weight concrete slab (unit weight 150 PCF, f’c= 3500 PSI) reinforced at mid-depth to upper 1/3 of slab with 6x6-W2.9xW2.9 welded wire fabric (WWF) or #3 bars @ 18” O.C. at owner's option, placed over 6mil polyethylene vapor barrier/retarder over 4” thick compacted layer of #57 washed crushed stone or approved compacted subgrade.
- New footing shall be 2'-6” below grade / frost line & shall be on an undisturbed soil. All contaminated soil must be removed.

DIVISION 3 - THERMAL AND MOISTURE PROTECTION

Damp proofing

- In areas where a high water table or other severe soil-water conditions are known to exist, exterior foundation walls that retain earth and enclose habitable or usable spaces located below grade shall be waterproofed with a membrane extending from the top of the footing to the finished grade. The membrane shall consist of 2-ply hot-mopped felts. The joints in the membrane shall be lapped and sealed with an adhesive compatible with the waterproofing membrane.

DIVISION 4 - CONCRETE

- All concrete construction including detailing, fabrication, placement of reinforcing, mixing, handling, placing, finishing, and curing shall conform to ACI “Structural Concrete for Building” (ACI 301), ACI “Manual of Standard Practice for detailing Reinforced Concrete Structures” (ACI-315), and “ACI Building Code Requirements for Reinforced Concrete”(ACI-318).
- All Concrete shall conform to ASTM C94. Minimum compressive strength and maximum water/cement ratio shall be as follows:

Foundations, walls, slabs on grade:	3500 psi (0.58)
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- Maximum aggregate size for regular concrete shall be ¾' and pea-gravel concrete shall be 3/8". Aggregate for regular weight concrete shall conform to ASTM C33 and lightweight concrete shall conform to ASTM C330.

All concrete exposed to the weather shall be air entrained with 6% +/- 1% air. All other concrete shall be air entrained with 4% +/- air unless concrete is interior-exposed and is to receive a hard-trowled finish. Slump shall be 4” +/- 1”.

- Owner shall retain the services of a qualified testing agency to provide testing of concrete to include compressive strength, temperature, slump and air entrainment.
- Contractor shall provide concrete mix design data for each type and strength of concrete shown in the structural drawings. The mix design data should include: concrete strength, slump, air entrainment, proposed aggregates, admixtures, and laboratory test data.
- Provide expansion joints at 150' O.C. and control joints at 25' O.C. at all exposed CIP walls (except basement walls). Coordinate joint locations with architectural drawings.

Reinforcement Steel

- All reinforcing steel except beam stirrups and column ties shall conform to ASTM-A615, Grade 40 unless notes otherwise.
- Welded wire mesh to conform to ASTM-A185. and have minimum side and laps 8”.
- Fabricate and provide standard supporting accessories in accordance with the ACI Manual of Standard Practice for Detailing Reinforced Concrete Structures ACI 315.
- Submit for approval shop drawing showing all reinforcing steel and placement. Provide locations of cold joints for extent of the concrete pour.
- All top reinforcing steel and beam stirrups in parking slabs and weather-exposed locations shall be epoxy coated per ASTM A 775/A 775M.

Concrete Protection for Reinforcement

- Reinforcing bars and mesh to have concrete cover as follows:

Footings and other concrete poured against earth	3”
Formed concrete exposed to earth for bars larger than #5.....	2”
Formed concrete exposed to earth for bars for #5 or smaller bars.....	1 ½”
Interior faces of walls.....	1”
Slabs on ground to have reinforcement in top third of thickness.	

DIVISION 5 - RETAINING WALL

- All construction shall be in compliance with the provisions of the 2006 IBC building codes.
- Work performed shall comply with all applicable local and state codes, ordinance and regulations.
- All work is to be performed in a professional manner and in accordance with standard practice and shall be in strict compliance with manufacturer's specifications and/or recommendations.
- Dimensions shall be read or calculated and never scaled. All dimensions are to the rough unless noted otherwise.
- Minimum Factor of Safety

F.S. Against Sliding	1.5
F.S. Against Overturning	1.5
F.S. Against Bearing Capacity Failure	2.0
- Lateral Earth Pressure:

Equivalent Fluid Pressure Per Ft. of Depth; Walls	45 PSF/FT
Passive Equivalent Fluid Pressure	300 PSF/FT
Coefficient of friction (Soil & Conc.)	0.30
- Foundations:

Soil Type:	SM/SC
Bearing Capacity (PSF):	1500
New footing shall be 2'-6” below grade line below frost line & shall be on an undisturbed soil, all contaminated soil must be removed.	
- Backfill Material:

Backfill soils having LL<40 and PI<20, and a friction angle of 30 degree or higher.	
Soil Type:	SM/SC More Granular
Density (PCF):	120
PHI (DEG):	30
Cohesion (PSF):	0

The cured concrete should attain a minimum strength of 75% of the specified compressive strength prior to any backfill placement.

- Concrete: Normal Weight, 4,000 PSI Compressive Strength at 28 days, air entrained to between 4%-6% air content)
- Weep Holes: 4” diameter schedule 40 PVC pipe at 5 feet on center.
- Drainage Board: MIRAFAI GN100N, or approved equivalent
- Geotextile:MIRAFAI 140NC, or approved equivalent
- Drainage Aggregate: VDOT NO.57 Stone
- Drainage:
 - Drainage of the backfill shall be provided with MIRAFAI G100N, or approved equivalent, as shown on the drawings. A 4 inch diameter hold shall be cut in the drainage board core at each weep hole location.
 - 4 inch diameter weep holes shall be field located at 4 feet on center, 3 inches above the soil at the front of the wall.
 - At each weephole location a 1 foot square bulb of VDOT NO. 57 stone wrapped in MIRAFAI C100N drainage composite geotextile shall be constructed to conduit water from drainage board out through the weephole. The geotextile shall overlap the drainage board by a minimum of 1 foot.

DIVISION 6 - WOOD

Lumber:

- All joists, rafters, and headers shall be, unless otherwise noted, Hem - Fir #2 or equal with the following minimum allowable stresses and modulus of elasticity:

Extreme fiber stress:	Fb= 1000 PSI (Repetitive member)
Horizontal shear:	Fv=95 PSI
Compression perpendicular to grain:	Fc=405 PSI
Modulus of elasticity:	E=1,300,000 PSI
Moisture content:	19%
- All exterior lumber and lumber in contact with masonry and concrete shall be pressure preservative treated in accordance with AWWA standards.
- All nailing shall comply with IBC code, latest edition and all state and local building codes.
- Built-up beams or joists formed by a multiple of 3-ply or less; 2x members shall be connected w/ 16d nails at 8” O.C.
- Build up at beams formed by 3 plys of laminated veneer lumber shall be fasten w 3-rows 16d nails at 12” O.C. on each side or per manufacturers recommendation.
- Block solid at all bearing supports where adequate lateral support is not otherwise provided.
- When framing end to end joists shall be secured together by metal straps.
- All rafters and joists framing from opposite sides shall lap at least three (3) inches and be spiked together.
- Do not alter sizes of members noted without the approval of Designer.

Cutting of Beams, Joist and Rafters:

- No structural member shall be omitted; notched, cut, blocked out or relocated without prior approval by the Designer.
- Cutting of wood beams, joists and rafters shall be limited to cuts and bored holes not deeper than one-sixth (1/6th) the depth of the member and shall not be located in the middle one-third (1/3rd) of the span. Notches located closer to supports than three times the depth of the member shall not exceed one-fifth (1/5th) the depth. Holes bored or cut into joist shall not be closer than two (2) inches to the top or bottom of the joists and the diameter of the hole shall not exceed one-third (1/3rd) the depth of the joist.

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SEAL

PROJECT TITLE

STRUCTURAL DESIGN
FOR
1521 VARNUM ST. NW
WASHINGTON, DC

ISSUES

NO.	DATE	DESCRIPTION

REVISIONS

NO.	DATE	DESCRIPTION

PROJECT NO:

2012-065

CAD DWG FILE:

2014-180 1521 VARNUM STREET NW STRUCTURAL SET.DWG

DRAWN BY:

AWA

CHKD BY:

SCALE:

SEE DRAWING

DATE:

07-15-2014

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

S-001

SHEET

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OF

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